

The invention claimed is:

1. A selective hydrogenation catalyst comprising Ni only or Ni and one or more elements selected from the group consisting of Cu, Re, Pd, Zn, Mg, Mo, Ca and Bi deposited on a support having the following physical properties: BET surface area of from 30 to about 100 m²/g, total nitrogen pore volume of from 0.4 to about 0.9 cc/g, and an average pore diameter of from about 110 to 450 Å.
2. The selective hydrogenation catalyst according to claim 1 wherein said support is selected from the group consisting of alumina, silica, zirconia, talcite, silica-alumina, and charcoal.
3. The selective hydrogenation catalyst according to claim 1 wherein said support comprises alumina.
4. The selective hydrogenation catalyst according to claim 3 wherein said alumina is calcined in a temperature range from about 750° to about 1200°C.
5. The selective hydrogenation catalyst according to claim 4 wherein said alumina has at least 30% of the pores larger than 100 Å diameter, and a total pore volume from about 0.405 cc/g to about 0.9 cc/g and ABD (apparent bulk density) from about 0.35 to about 0.75 g/cc.
6. The selective hydrogenation catalyst according to claim 5 wherein said alumina has at least 50% of the pores larger than 100 Å diameter.
7. The selective hydrogenation catalyst according to claim 3 wherein said alumina contains less than about 2 wt.% alkali metal.
8. The selective hydrogenation catalyst according to claim 3 wherein said alumina comprises transition alumina comprising the delta, kappa, theta and alpha crystalline forms or mixtures thereof.
9. The selective hydrogenation catalyst according to claim 1, 2, 3, 4, 5, 6, 7 or 8 wherein said nickel content of the catalyst comprises from about 4 wt. % to about 20 wt. %.
10. The selective hydrogenation catalyst according to claim 9 wherein said catalyst comprises from about 0.005 wt. % to about 10 wt. % Cu.
11. The selective hydrogenation catalyst according to claim 9 wherein said catalyst comprises from about 0.1 to about 5 wt. % Re.
12. The selective hydrogenation catalyst according to claim 9 wherein said

catalyst comprises from about 0.01 to about 2 wt. %Pd.

13. The selective hydrogenation catalyst according to claim 9 wherein said catalyst comprises from about 0.1 to about 10 wt. % Zn.

14. The selective hydrogenation catalyst according to claim 9 wherein said catalyst comprises from about 0.1 to about 7 wt. % Ca.

15. The selective hydrogenation catalyst according to claim 9 wherein said catalyst comprises from about 0.1 to about 7 wt. % Mg.

16. The selective hydrogenation catalyst according to claim 9 wherein said catalyst comprises from about 0.1 to about 10 wt. % Mo.

17. The selective hydrogenation catalyst according to claim 9 wherein said catalyst comprises from about 0.05 to about 7 wt. % Bi.

18. The process of preparing a selective hydrogenation catalyst comprising impregnating a support having the following physical properties: BET surface area of from 30 to about 100 m²/g, total nitrogen pore volume of from 0.4 to about 0.9 cc/g, and an average pore diameter of from about 110 to 450 Å with soluble salts of Ni only or Ni and one or more elements selected from the group consisting of Cu, Re, Pd, Zn, Mg, Mo, Ca and Bi from one or more solutions to form an impregnated support.

19. The process of preparing a selective hydrogenation catalyst according to claim 18 wherein said impregnated support is dried and calcined at a temperature in the range from 200° to 600°C.

20. The process of preparing a selective hydrogenation catalyst according to claim 18 wherein said impregnated support is dried and calcined at a temperature in the range from 250° to 500°C.

21. The method of selectively hydrogenating acetylenic compounds comprising contacting a feed containing acetylenic compounds and other unsaturated compounds with a catalyst comprising Ni only or Ni and one or more elements selected from the group consisting of Cu, Re, Pd, Zn, Mg, Mo, Ca and Bi deposited on a support having the following physical properties: BET surface area of from 30 to about 100 m²/g, total nitrogen pore volume of from 0.4 to about 0.9 cc/g, and an average pore diameter of from about 110 to 450 Å under selective hydrogenation conditions and recovering a product having less acetylenic

compounds than said feed.

22. The method of selectively hydrogenating acetylenic compounds according to claim 21 wherein said support is selected from the group consisting of alumina, silica, zirconia, talcite, silica-alumina, and charcoal.

23. The method of selectively hydrogenating acetylenic compounds according to claim 21 wherein said support comprises alumina.

24. The method of selectively hydrogenating acetylenic compounds according to claim 21 wherein said alumina is calcined in a temperature range from about 750° to about 1200°C.

25. The method of selectively hydrogenating acetylenic compounds according to claim 24 wherein said alumina has at least 30% of the pores larger than 100 Å diameter, and a total pore volume from about 0.405 cc/g to about 0.9 cc/g and ABD (apparent bulk density) from about 0.35 to about 0.75 g/cc.

26. The method of selectively hydrogenating acetylenic compounds according to claim 25 wherein said alumina has at least 50% of the pores larger than 100 Å diameter.

27. The method of selectively hydrogenating acetylenic compounds according to claim 26 wherein said alumina contains less than about 2 wt.% alkali metal.

28. The method of selectively hydrogenating acetylenic compounds according to claim 26 wherein said alumina comprises transition alumina comprising the delta, kappa, theta and alpha crystalline forms or mixtures thereof.

29. The method of selectively hydrogenating acetylenic compounds according to claim 21, 22, 23, 24, 25, 26, 27 or 28 wherein said nickel content of the catalyst comprises from about 4 wt. % to about 20 wt. %.

30. The method of selectively hydrogenating acetylenic compounds according to claim 21 wherein a solvent is co-fed with the feed.

31. The method of selectively hydrogenating acetylenic compounds according to claim 30 wherein said solvent is selected from the group consisting of cyclohexane, methyl cyclohexane, benzene, toluene, alkyl nitriles, furfural, dimethyl acetamide, dimethyl formamide, methylpyrrolidone, formylmorpholine, and ethers and mixtures thereof.